

What is claimed is:

1. An apparatus for reproducing an interactive content from an information storage medium, the interactive content including AV data including audio data and video data, a markup document, and/or a markup resource file, the apparatus comprising a font control means, which determines a pixel aspect ratio of a font according to aspect ratio information and resolution information of an input markup document, performs a preprocess of enlarging or reducing a size of the font according to the determined pixel aspect ratio, and outputs the preprocessed font data adaptive to a change in the aspect ratio and resolution of the screen on which the interactive content is displayed.
2. The apparatus of claim 1, wherein the aspect ratio information is embedded in the markup document using a tag.
3. The apparatus of claim 2, wherein the markup document contains resolution information and screen aspect ratio information indicating a 16:9 screen, a 4:3 screen, a 1:1 screen, or no-relation to the screen aspect ratio which includes a case where no aspect ratio is set for the markup document.
4. The apparatus of claim 2, wherein when the tag for the aspect ratio information of the markup document does not exist in the markup document, basic screen aspect ratio information set in the reproducing apparatus is used as screen aspect ratio information of the markup document.
5. The apparatus of claim 1, wherein the font control means stores matrix information indicating values for enlarging or reducing the font according to the aspect ratio information of the markup document.

6. The apparatus of claim 5, wherein the matrix information comprises a matrix used for an aspect ratio of 4:3, a matrix used for an aspect ratio of 16:9, a matrix used for a basic aspect ratio of 14:9, and a matrix used for an aspect ratio of 1:1.

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7. An apparatus for reproducing an interactive content from an information storage medium, the interactive content including AV data including audio data and video data, a markup document, and/or a markup resource file, the apparatus comprising:

10 a reader, which reads data from the information storage medium;  
and

a presentation engine, which enlarges or reduces a font, made at a predetermined pixel aspect ratio, using aspect ratio information of the markup document read by the reader, the markup document containing  
15 the aspect ratio information and resolution information which are optimally suitable to the markup document, and outputs the enlarged or reduced font adaptive to a screen having a different aspect ratio and resolution from the aspect ratio information and the resolution information contained in the markup document with a minimum  
20 distortion.

8. The apparatus of claim 7, wherein the aspect ratio information is embedded in the markup document using a tag.

25 9. The apparatus of claim 8, wherein when the tag for the aspect ratio information of the markup document does not exist in the markup document, basic screen aspect ratio information set in the reproducing apparatus is used as screen aspect ratio information of the markup document.

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10. The apparatus of claim 9, wherein the presentation engine

comprises a font decoder, which stores matrix information indicating values for enlarging or reducing the font according to the aspect ratio information of the markup document.

5           11. The apparatus of claim 10, wherein the matrix information comprises a matrix used for an aspect ratio of 4:3, a matrix used for an aspect ratio of 16:9, a matrix used for a basic aspect ratio of 14:9, and a matrix used for an aspect ratio of 1:1.

10           12. The apparatus of claim 7, wherein the markup document contains resolution information and screen aspect ratio information indicating a 16:9 screen, a 4:3 screen, a 1:1 screen, or no-relation to the screen aspect ratio which includes a case where no aspect ratio is set for the markup document.

15           13. The apparatus of claim 12, wherein when the screen aspect ratio information indicates the 4:3 screen, the font decoder enlarges a font having a square pixel aspect ratio to have a first ratio and outputs the enlarged font to the 4:3 screen so that the enlarged font  
20           having the first ratio is reduced and displayed at almost the square pixel aspect ratio on the 4:3 screen.

          14. The apparatus of claim 12, wherein when the aspect ratio information indicates the 16:9 screen, the font decoder reduces a font,  
25           having a square pixel aspect ratio to have a second ratio and outputs the reduced font to the 16:9 screen so that the reduced font having the second ratio is enlarged and displayed at almost the square pixel aspect ratio on the 16:9 screen.

30           15. The apparatus of claim 7, further comprising:  
          a decoder, which decodes the AV data read by the reader and



outputs a video image and a sub-image; and

a blender, which blends the AV data and a rendered markup document so that the AV data is displayed on a display window defined by the markup document,

5 wherein the blender comprises:

a video converter, which converts a format of the video image into a pan & scan format or a letterbox format according to a screen aspect ratio and a resolution of a display apparatus or outputs the video image as it is without converting it;

10 a first mixer, which mixes the video image from the video converter and the sub-image;

a video position/image size controller, which controls a position of the mixed image from the first mixer and a size of an AV image displayed on a screen of the display apparatus according to input video layout  
15 information;

a graphic image converter, which converts a size of a graphic image of a markup image source provided from the presentation engine;

a second mixer, which mixes an output of the video position/image size controller and an output of the graphic image  
20 converter and outputs the result of mixing to the display apparatus so that the result of mixing can be displayed on the screen of the display apparatus; and

a controller, which controls the video converter and the graphic image converter according to the screen aspect ratio and the resolution  
25 of the display apparatus.

16. A method of reproducing an interactive content from an information storage medium, the interactive content including AV data including audio data and video data, a markup document, and/or a  
30 markup resource file, the method comprising:

determining a pixel aspect ratio of a font according to aspect ratio



information and resolution information of an input markup document;  
performing a preprocess of enlarging or reducing the font before  
displaying it; and  
outputting the preprocessed font data adapted to an aspect ratio  
5 and a resolution of a screen on which the interactive content is  
displayed.

17. The method of claim 16, wherein the aspect ratio  
information of the markup document is embedded in the markup  
10 document using a tag.

18. The method of claim 17, wherein determining the pixel  
aspect ratio comprises setting basic screen aspect ratio information set  
in the apparatus as screen aspect ratio information of the markup  
15 document when the tag for the aspect ratio information of the markup  
document does not exist in the markup document.

19. The method of claim 18, wherein the markup document  
contains the resolution information and the aspect ratio information  
20 indicating a 16:9 screen, a 4:3 screen, a 1:1 screen, or no-relation to the  
screen aspect ratio which includes a case where no aspect ratio is set for  
the markup document.

20. The method of claim 16, wherein enlarging or reducing the  
25 font comprises converting the font using matrix information indicating  
values for enlarging or reducing the font according to the aspect ratio  
information of the markup document.

21. The method of claim 20, wherein the matrix information  
30 comprises a matrix used for an aspect ratio of 4:3, a matrix used for an  
aspect ratio of 16:9, a matrix used for a basic aspect ratio of 14:9, and a

matrix used for an aspect ratio of 1:1.

22. The method of claim 20, wherein when the screen aspect ratio information indicates the 4:3 screen, enlarging or reducing the font comprises enlarging a font having a square pixel aspect ratio to have a first ratio, and outputting the font data comprises outputting the enlarged font to the 4:3 screen, so that the enlarged font having the first ratio is reduced and displayed at almost the square pixel aspect ratio on the 4:3 screen.

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23. The method of claim 20, wherein when the aspect ratio information indicates the 16:9 screen, enlarging or reducing the font comprises reducing a font having a square pixel aspect ratio to have a second ratio, and outputting the font data comprises outputting the reduced font to the 16:9 screen, so that the reduced font having the second ratio is enlarged and displayed at almost the square pixel aspect ratio on the 16:9 screen.